Claims

1) A predictive choice process of a manufacturing process of an optical component intended to be subjected to laser fluxes, the choice being intended to select from among several possible manufacturing processes that which results in components having better laser flux behaviour than those obtained by the other possible processes, characterised in that

a) a number N of measurements of cathodoluminescence are made on components obtained by a first of the possible manufacturing processes, while the component receives an electronic beam having a determined energy, a determined focusing at the surface of the component and a determined intensity controlled by a value of a ground current measured on the component, while it is being submitted to said electronic beam,

b) an average cathodoluminescence value on the N measurements is calculated,

c) operations a) and b) on components obtained by each of the other possible manufacturing processes are repeated,

d) the most advantageous manufacturing process is decided as the one for which the average cathodoluminescence value is the lowest.

2) The process as claimed in Claim 1, characterised in that steps a) to c) for different energy values of the electronic beam are repeated, and in that a histogram of the average cathodoluminescence values for each of the energies is established,

in calculating the average cathodoluminescence value an integration of the cathodoluminescence values on the different energies of electronic beams is taken into account.

3) A process for controlling a state of a surface of an optical component intended to be a surface of incidence of a laser beam, so as to determine whether said surface has a default density which is less than a default density beyond which the optical component is likely to be damaged by submission to a laser flux having a power (flux density) at most equal to a predetermined threshold for a maximum predetermined duration, characterised in that

a) samples of said optical component are produced by the same manufacturing process, in particular as concerns the state of said incident surface, and they are separated into first and second samples,

b) in a preliminary calibration phase a correlation between cathodoluminescence values obtained in conditions of determined electronic shots, and laser flux behaviour of the first samples is made on the first samples, this correlation helping to determine one or more cathodoluminescence thresholds, each threshold corresponding to behaviour conditions of the first samples to laser flux, a component having a cathodoluminescence value less than one of the thresholds being acceptable for the behaviour conditions having resulted in this threshold, and rejected for these conditions in the opposite case,

c) the cathodoluminescence value produced on a second sample is measured by electronic shots taken in the same conditions as in step b), the component is accepted for all the behaviour conditions corresponding to thresholds greater than the value measured, and is rejected for all the behaviour conditions corresponding to thresholds less than the value measured.

d) step c) is repeated on other second samples on a specific basis or by sampling.

4) The process as claimed in Claim 3, characterised in that to carry out step b)

b11) fault densities are determined on zones of the first samples having been subjected to laser shots of powers different to one another and on zones not having been subjected to shots,

b12) shots of electronic beams of intensity controlled by measuring the ground current, the different electronic shots having the same electronic energy and the same intensity, are made on the zones having been subjected to laser shots and on the zones not having been subjected thereto, the cathodoluminescence values are measured,

b13) a line is traced correlating the default density and the cathodoluminescence value,

b14) a threshold or several fault thresholds, and correlatively cathodoluminescence thresholds beyond which the component must be rejected for a given application, is determined by means of the line and the effects of the fault densities on the aptitude of the component to withstand the laser flux to which it must be subjected.

5) The process as claimed in Claim 4, characterised in that to carry out step b)

b15) steps b12 and b13 are repeated for different energy values of the electronic beam,

and in that in step b14)

the threshold value is determined from the line of greatest slope, in absolute value.

6) The process as claimed in Claim 3, characterised in that to carry out step b)

b21) a surface of incidence of first samples of said optical component is subjected to shots of electronic beams having different energies and the same known intensity, the intensity being controlled by measuring the ground current of said sample subjected to the shot of said electronic beams,

b22) while each of said optical components is subjected to the shot of an electronic beam, apart from the ground current to be applied to the instantaneous control of the intensity of the electronic beam, the cathodoluminescence intensity of said optical component is measured,

b23) the value of the cathodoluminescence intensity is recorded for each of the samples processed by an electronic beam of the same energy and same intensity,

b24) the first samples are sorted by ascending order of default densities, the samples having the fewest faults being those for which the value of the cathodoluminescence intensity is the lowest,

b25) the first samples are subjected to laser flux having the maximum threshold power for which the components are provided, and for a duration equal to the maximum duration during which the optical components must receive this flux without undergoing any damage,

b26) the N highest cathodoluminescence intensities are taken from the components subjected to flux at step b25) and which have not undergone any damage, and it is decided that a maximum cathodoluminescence intensity calculated from a linear combination of these N cathodoluminescence intensities is the intensity of maximum acceptable cathodoluminescence measured for said optical components.